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Parametric Modeling and Measurements of Pulsed Source and Bias Plasmas PETER VENTZEK, Z. CHEN, Tokyo Electron America, Inc., Y. FUKUNAGA, Nagoya University, K. SUZUKI, R.R. UPADHYAY, Esgee Technologies, L.L. RAJA, The University of Texas at Austin, M. SEKINE, Nagoya University, A. RANJAN, TEL Technology Center America, Inc. — Pulsed plasmas for materials processing take many forms including gas, source and bias pulsing. Born as a solution for plasma damage control, variations on pulsed plasmas are used for control of selectivity, profile and critical dimension variations. Atomic layer etching for precision etch relies on plasma pulsing to discriminate volatile layer formation and removal phases. Integral to the performance of pulsed plasmas is the ion energy and angular distribution functions (IEADF) and the radical to ion flux ratio. This presentation will describe the influence of key plasma parameters (source, bias and relevant pulse frequencies, plasma source configuration) on IEADFs. We focus on bias and relevant pulse frequencies and plasma source configuration. A challenge is simulation of a sufficient number of pulse periods to include sufficient species transit times at higher pressures. A further challenge is obtaining sufficient particle statistics to represent the wide range of energies and flux over an entire pulse cycle. We employ VizGlowTM, a finite volume based solver, to simulate a generic plasma and VizGrain, a companion test particle solver to describe pulsed plasmas and their IEADFs. Measurements of IEADFs on a test plasma platform are compared with the simulation results.

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